Chapter Sixteen
SAFETY

Table of Contents

CHAPTER SIXTEEN

SAFETY

INTRODUCTION

Manufacturing plants, blenders, processors, elevators, mills, and warehouses can be hazardous work environments. The inspection of these firms involves working in many potentially hazardous situations. Since inspectors work alone much of the time, personal safety must be foremost in their minds at all times. Safety equipment to ensure maximum protection under any and all conditions must always be on hand and used when needed or required. As a professional, be aware of the dangers of the profession and accustomed to the peculiarities of each establishment. Exercise care and use common sense at all times. Personal safety is always more important than any sample.

Accidents may be caused by physical hazards such as faulty equipment, or they may be caused by human factors such as complacency, haste, or error. Preventing accidents by eliminating these causes depends on the willingness of everyone concerned to conform with known safe practices. Ignorance of safety instructions is no excuse for their violation. If there are questions about the safe way to do a job, ask a supervisor for help and instruction.

The main component of any safety program begins with preparation and planning.

GENERAL

Note of Advice: The inspector should be aware that the wearing of jewelry, ties, loose flowing clothing, having long flowing hair, etc. can pose a safety hazard to the inspector around equipment, machinery, etc.

Safety hazards found at various establishments, elevators, mills, and warehouses may be many and varied. Caution must start at the main entrance. Vehicular traffic within the plant grounds may not follow normal movement patterns nor obey usual traffic rules. Also, the nature and size of equipment used may make it difficult for the driver to see persons working nearby.

When in the facility, inspectors must make sure management or employees know where they are going to be. Management personnel should provide information on possible dangers or areas

to avoid during the inspection. Also, inspectors must notify management where they will be working in case an inspector is hurt, or in case of an emergency. Follow all safety regulations required by establishment personnel (no smoking, ear protection required, etc.).

Safety Equipment

Many products encountered in plants and mills may be corrosive or destructive to clothing, footwear, or other safety equipment. Industrial solvents, pesticides, or fertilizers can all eat away equipment. Regular cleaning, visual checks, and maintenance must be performed. Several forms of protective or safety equipment are available for use. A general discussion of the various types or personal protective equipment (PPE) is presented below.

Eye Protection

Inspectors must use the following types of eye protection equipment:

- **Goggles**. Provide an impervious barrier against objects getting into the eyes because they form a tight seal around the eye areas. They often may be uncomfortable and hard to see through because of condensation. Goggles may be directly vented, indirectly vented, or non vented. Directly vented goggles may be used for particle deflection. They will not, however, be impervious to liquids. Indirectly vented goggles will afford protection from particles as well as most liquid spatters. Non vented goggles should be used when dealing with anhydrous ammonia.
- **Face shield**. The face shield forms a plane of protection in front of the eyes. The eyes, nose, and mouth can be protected from direct (perpendicular to the shield) exposure. Objects or substances coming from other directions, however, may get into the face or eyes. When not in use, the face shield may be flipped out of the way to wipe the face. A shield may also be used easily over prescription glasses. A face shield affords only secondary protection and must be used with either goggles or safety glasses.
- **Safety glasses**. Safety glasses are available in either clear lenses or prescription lenses. Like the shield, they do not afford protection from non direct exposure. Side guards are available to protect from non direct exposure and must be used to make them more effective. If glare may be a problem, tinting may be added.
- **Welding safety**. Often construction or welding may be encountered in the workplace. Be certain not to look directly at welding. Welding produces bright light and harmful ultraviolet light. Sparks are also emitted. Stay away from welding operations and do not look directly at the operation.

Foot Protection

Types of foot protection include the following:

- **Footwear (shoes or work boots)**. Footwear must first and foremost be comfortable to wear and provide proper support. Secondly, it must have a steel toe or protective support in case objects are dropped on the foot. The sole and heel of the footwear must be appropriate for the working environment. Do not wear slick soled shoes, or sneakers. Footwear must also fit snugly and be supportive. A good practice is to "waterproof" footwear; this function should be performed regularly. Regular work boots or shoes are not suitable when handling or mixing pesticides. Rubber boots or neoprene boots must be worn. The exposure from these sources comes from the material soaking up the pesticide and exposing the person through skin contact. Cases have occurred where workers have been exposed and became seriously ill from exposure through shoes or boots. Make sure proper protective mechanisms are used to prevent your feet from being exposed to pesticides or caustic chemicals.
- **Rubber boots or galoshes**. Rubber boots provide a protective barrier against water and some solvents. They also may be easily cleaned. Either "gum" boots, pull over boots, or buckle boots may be used.
- **Neoprene boots.** These boots will afford protection from various chemicals and solvents.
- **Tyvek booties.** These booties can be worn over shoes/boots and add a large degree of protection from absorption of chemicals into shoes, boots, and the body.

Hand Protection

When necessary, inspectors must utilize the following to protect their hands:

Hand protection comes in many forms. The class or material type of gloves used must be taken into account when selecting the proper type for use. Certain gloves may have long shanks and afford protection for the wrist or lower arm. Be aware that cuffs present a hazard by allowing material to collect in the cuff or may get caught in machinery.

- **Work gloves (cotton or jersey)**. These gloves will provide warmth in the winter and some protection from dirt and blisters. Be careful not to use cotton or cloth gloves when working with pesticides, chemicals, or solvents. Cloth gloves will act as a wick and absorb these products, keeping them in contact with the skin.
- **Disposable latex gloves**. These gloves are easy to use and afford protection from some fertilizers, seed treatments, dirt, grease, non-corrosive materials or liquids. They are easy to use and readily disposable. One factor to keep in mind is

that a few people may be allergic to latex. If a rash occurs, seek proper medical attention. The disadvantage is that these gloves do not afford protection against corrosive materials or certain chemicals. When using latex gloves, determine for what products the gloves are rated.

< **Heavy rubber gloves**. These gloves afford the best protection when working around pesticides or other similar products. These gloves are easily rinsed or cleaned when liquids are spilled on them.

Ear Protection

The following ear protection equipment is recommended:

< **Disposable foam plugs.** These are inexpensive, easily stored and used; but they may be uncomfortable to wear. Make sure the plugs are rated with the proper protection for the environment you will be working in.

< **Padded hearing protectors** These are the typical "headphone" type protectors. They afford both noise protection as well as a cover for the ear. Usually they are rated higher than typical plugs and prevent compacting the ear canal.

Nasal, Mouth, and Respiratory Protection

Inspectors must use the following types of respiratory protection equipment:

< **Disposable dust masks**. These masks are easily worn and afford little or no protection from pesticides. However, they may be used for general dust and limited airborne particulates. Dust masks only prevent particles from passing through, and offer little or no protection against caustic or dangerous fumes, pesticides, etc.

< **Respirator**. Usually respirators contain various filters that can be interchanged depending upon the hazards of the working environment. They are rated for particular substances. Be aware of the respirator's rating and the protection it affords. Likewise, be aware of the respirator's limitations. Respirators must never be used in oxygen deficient environments.

- Note: Facial hair may prevent a tight seal.
- Test according to the manufacturer's directions to ensure an air-tight seal.
- An air-tight seal, may present a greater problem for women than for men because man respirators are sized to fit a man's face. Ensure a tight fit can be achieved prior to leaving the office.

< **Air packs.** Self-contained breathing apparatuses (SCBA) contain a mask, oxygen tank, and regulator. Before using

SCBA, inspectors must have attended the 40-hour Hazard Materials Training course and obtained a physician's approval to wear it. It is extremely important that two SCBA-trained people be on hand when entering oxygen deficient environments.

Head Protection

Proper head protection is recommended on most inspections.

Steel or molded hats must be used to protect the head and skull from falling objects or head height obstacles.

Back Protection

When lifting heavy objects, use a proper back support or a lift belt.

Clothing Protection

Inspectors must use the following to protect clothing:

- **Cloth coveralls**. Protective outwear is available to be worn over your normal clothing. Lightweight coveralls can be used during the summer months while insulated coveralls can be used in the winter. These coveralls will keep clothing from receiving stains while in dirty work environments.
- **Tyvek coveralls**. Tyvek is an extremely lightweight disposable "Paper like" substance that is extremely hard to tear. Tyvek is the preferred material because, unlike cloth, it does not absorb and, if contaminated, can be discarded.

Always Use Safety Devices and Protective Equipment

Inspectors should always have a clean Tyvek coverall for each inspection (which requires such an item) to prevent cross contamination of sites and/or samples, etc. It may be necessary to change solid coveralls frequently at one inspection site.

Also see Respiratory Protection Policy and Procedures.

If there is a need to use a protective device that has not been supplied or if there are safety concerns, notify a supervisor.

Safety Reminders

Keep in mind the following while conducting inspections:

- Hardhats must be worn at all times while on manufacturing and warehouse premises. Prior to entering the plant or facility, inquire about the firm's safety polices. Many firms require visitors to wear a hard hat and/or safety glasses.
- Safety shoes with non-slip soles and heels must be worn. Clothing should be close fitting. Make sure laces are tied.
- Flashlights must be carried, especially when work assignments involve the upper floors or basements.
- Dust masks or properly rated respirators must be worn in dust laden environments.

< While in the establishment, make sure equipment is secure during transit. An ink pen in a shirt pocket may fall out during the inspection and be incorporated into the firms equipment or product. A probe, flashlight, or folder may slip or fall during climbing or conducting the inspection. This may cause personal injury or injury to other employees.

Awareness

An inspector must not enter a grain elevator, grain mill, warehouse, railroad tank/car, or silo unless the facility's supervisory personnel have been alerted as to his/her presence and location where he/she will be working. Workers in the area should know who an inspector is and where he/she will be working or planning to work, and what he/she will be doing. Inspectors must not enter areas where they have no official purpose.

Plant, elevator, mill, and warehouse fires are not uncommon. Know the location of exits, telephones, and first aid equipment, and especially emergency evacuation routes and procedures. Read and follow all warning signs.

Construction and maintenance work is often being performed during business operations in all plants. This activity may increase the possibility of fire or other mishaps. Keep a safe distance from construction and maintenance activities.

When entering an elevator, mill, or warehouse from bright outside light, vision may be temporarily impaired. Stop and let your eyes adjust before continuing the inspection. Be aware of the surroundings. Avoid stepping on manhole covers since they may slide from underfoot.

Be conscious of the machinery being used. Observe conditions surrounding the various products to be sampled, with emphasis on the danger of front-end loaders, hopper and tank cars, forklifts, conveyor belts, motor drives, mixers or blenders, welding and cutting, drag and screw conveyors, falls from heights and electrical equipment. Stay away from machinery, whether it is operating or not. The "dead" machinery may be started by a remote control switch located in another part of the plant. Do not sit or step on a motionless conveyor belt. Cross over conveyors only on cross bridges or walk around the belt end.

Watch for wet floors. Dust caused by loading or unloading feed, fertilizer, or related products can mix with the moisture on the floors, making them extremely slippery and hazardous.

When the air is dust laden, the ability to see is reduced. This is not an unusual condition and can be dangerous. In this environment, protect both eyes and respiratory system with the proper equipment.

High pressure air lines must not be used to blow dust from clothing or the body. Foreign matter such as metal fragments, oil, or water can be blown under the skin or into eyes, causing a painful or serious injury.

Grain dust is extremely dangerous, because it is highly explosive. The grain industry has had damaging explosions with loss of life and property. There must be NO SMOKING at any time in an elevator, mill, or facility. Additionally, flash attachments to cameras or other equipment that generate sparks may ignite a dust explosion. The key is the concentration of dust in the atmosphere. Different materials have different explosion concentrations. It is imperative that inspectors discuss their needs with facility staff prior to entering a facility with airborne dust concentrations that might be explosive.

PHYSICAL HAZARDS

Inspect trucks, rail cars, or storage areas and assess their condition. Be cognizant of fumigant odor; however, remember that some toxic fumigants have no odor. Rather than take any chances, check with management to eliminate any risk of exposure. DOT regulations and pesticide labels usually require that warning signs be placed on rail-cars containing fumigated commodities. If there is a fumigant notice on the car, especially if it has a recent date, (3 days or less), or if you detect a fumigant odor, do not open it. Notify the firm management to have a qualified person determine if it is safe to open the car. The firm's qualified person must open the doors on both sides of the car and allow the car to air out for a prescribed length of time before allowing anyone to enter. Remember, some fumigants may not have a detectable odor, but are still a hazard.

Do not enter trucks, rail cars, or storage areas during the application of these materials, or enter where the materials have been applied unless the atmosphere has been certified safe by a competent person.

Sampling Trucks and Trailers

Sampling around moving trucks and trailers presents a hazardous working climate. The key factor to prevention of accidents in this area is alertness. Stay constantly aware of moving vehicles and the fact that drivers can be careless. The following lists the safe guidelines for sampling trucks and trailers:

- Be sure that the driver knows that someone is sampling his load so that he will not move the truck until sampling is completed. It may be a good idea to chock or block the wheels of the truck or trailer.
- Reread Physical Hazards statement regarding fumigants.
- Use a ladder to get into and out of trailers. If the ladder is slick, wipe it off with paper towels or a cloth prior to ascending.
- Always carry or lift probes and other equipment into trucks and between units. Never toss or throw equipment.

- Don't ride on running boards or crawl under trucks or trailers.
- Always be alert and watch for moving vehicles.
- On van-type trailers, the driver is required to open doors. Always check the security of the doors before entering.
- When probing, always be alert for hidden obstructions such as cross braces and bars as well as the sides and bottom of the trailers. Hitting such obstructions with a sudden force can cause serious injuries to your ribs, shoulder, face, or teeth as well as damage to the trailer and probe. To prevent such occurrences, do not put weight onto the probe from a standing or running position.
- Always be alert for overhead obstacles. Power lines, lights, building overhangs, and other potential hazards can cause severe injury. Stay alert.

Sampling Rail Cars

Railroads are always hazardous work environments. Sampling personnel performing duties on boxcars and hopper cars must be very careful. Minimize the possibility of an accident or injury by knowing and observing the rules of safety.

Keep in contact when entering any boxcar or hopper car in a railroad yard or car siding. Inspectors who are part of a team or by themselves must be certain that someone is aware of where they are working and the length of time it will take to obtain the samples. Different departments may have specific rules regarding the entry into the box car. Consult a supervisor for all necessary instructions. Persons that must be notified include:

- Manager of the plant
- Person in charge of unloading
- Track-master responsible for the movement of trains

The person or persons notified prior to sampling of boxcars or hopper cars must also be notified when you are finished.

Railcars to be sampled are classified as either boxcars or hopper cars. The physical characteristics of the two are completely different and the hazards involved are unique. Therefore, each will be covered separately.

Boxcars

First, assess the boxcar's condition. Next, notice the seal that must be broken. A cutting tool such as side cutters or a pry bar must be used to cut or break the seal. Wear protective eye wear when breaking the seal. Seal locking mechanisms often fly apart as they are broken and may also be sharp and cut hands or skin.

Opening and closing car doors can be hazardous. When using a pry bar, push the door away from you. Never stand beside the door; it may come free of its track and fall.

Note the condition of the grain door and watch for protruding nails and steel strapping. Place sampling equipment on the door sill and climb into the car. Never throw sampling equipment into the car before entering.

Check the inside of the car for protruding nails, bolt heads, etc. Older boxcars may have wire, rods, or wooden cross braces; use care not to strike them.

When probing, do not place excessive body weight onto the probe from a standing position. Rib or shoulder injury may occur if the material or product is shallow and the end of the probe strikes the floor.

Use the same care in dismounting from the car as when entering. Do not throw sample or equipment from the car; it could hit someone below or damage the equipment or sample.

Hopper Cars

The hopper car is a special purpose type carrier that requires sampling from the top either through individual hatches or a continuous opening down the center of the car. Because of its unique construction and the longer and heavier equipment required for sampling, it is probably more dangerous to sample than a boxcar.

The first thing to look for when approaching a hopper car is electric power lines above or close to the car. Serious injury to inspectors has occurred as a result of the sampling probe coming in contact with electric lines. If lines are present, extreme care and caution must be used during the sampling operation.

Check the condition of the car's ladders. If a ladder is damaged, loose, or bent, go to the other end of the car and check for a more secure ladder. Ascend the ladder carefully.

Watch for the approach of a switch engine or switched car while working atop hopper cars. If, during sampling, the car is moved and there is no time to get down from (out of) the car, kneel or sit down to lessen the possibility of falling from the car.

Care must be used in breaking seals. Many lids and hatch covers are quite heavy and require proper lifting techniques. A back brace will help prevent injury. When probing is started, care must be taken not to probe into the sides of the hopper car bottoms; this will cause the probe to stop suddenly.

While atop hopper cars, be especially careful if there is spilled, loose, or wet product or dust. In winter, there may be ice, frost, or snow. Safety belts are required by OSHA regulations to enter a hopper car since it is a confined space. It is the inspector's responsibility to decide whether or not the condition presents such a hazard as to deem the car too dangerous for sampling at that time.

High winds during the sampling of a hopper car can blow the hatch covers on the inspector or blow the inspector or his/her equipment off of the car. Such conditions are considered too hazardous for sampling activities.

Never, never, sample a hopper car from above when any partial or incomplete unloading has occurred. Hopper bins may present a false "skin" or layer that can break and trap persons attempting to collect samples. It is a potential deadly situation. Notify the person in charge of unloading when you are finished sampling.

Sampling Bins and Tanks

Be alert and take proper safety precautions in plants, silos, bins, pits and any closed areas where bulk products are stored and asphyxiation hazards exist. If certain products are improperly stored, improperly handled, or decomposing, dangerous amounts of carbon dioxide, or other gases may deplete the oxygen supply in these areas. Closed bins or tanks must never be entered for the purpose of obtaining probe samples without prior approval of a supervisor. Prior to bin or tank entrance, it must be determined that the oxygen content of the bin or tank is sufficient to sustain life. Fumigated or treated bins or tanks must not be entered until a "Gas Free Certificate" or an "Entry Permit" (with multiple confined space requirements) has been posted.

When it is necessary to enter a bin, advise the facility supervisor and workers in the bin area before entering, and again when the bin is cleared. Turn-heads, spouts and trippers must not be set for that bin. Before entering a bin, it must be inspected first from the top to make sure that no grain is hung up. Do not jump down on top of the grain - there may be a cavity caused by crusted grain which could break. Do not enter bins without a proper safety belt. Many people have lost their lives by entering bins without taking the proper precautions.

Sampling Bagged or Packed Products

Stay alert when collecting samples during the bagging or packaging process, and when samples are stored in a warehouse. Loose fitting jewelry must be removed. Check-weighing requiring the removal of bags or packages from the line can cause injury. Be alert for the movement of forklifts used to move the commodity. Stacked paper or polypropylene bags can shift or may fall easily. When sampling stacked bags or containers on pallets and a ladder is required, ensure the ladder provides stable footing before using.

Sampling Bulk Bagged Products (Large Volume Bags)

One of the trends in some industries is to go to the large 2,000 pound bags instead of the typical 50 pound package. Frequently, these bags are transported in a frame and tend to be double lined. The outside bag is a tough canvas or plastic material while the inner bag is a simple plastic liner. Typically, theses bags will be six or seven feet tall and can only be accessed from the top. If a ladder is needed, secure it with the proper footing before attempting to sample. Also, be aware that the outer material is slippery and weight applied to a stack may cause the stack to shift or slip and induce a hazardous situation.

GENERAL SAFETY PRECAUTIONS

Man-Lifts and Cage-Type Elevators

Most mills and elevators have elevating devices to transport personnel between working levels. They are normally cage-type elevator or continuous vertical belt types.

Man-lifts

Never attempt to ride a man-lift without getting the proper instruction in its operation. When riding an endless belt man-lift, always take the following precautions:

< Face the belt.

< Keep feet firmly on the steps.

< Hold on to the hand holds with both hands.

Freight, packaged goods, or sampling equipment must not be carried or handled on any man-lift. Only tools which fit entirely within a pocket or tool belt should be carried on man-lifts.

Cage-Type Elevators

The cage-type is similar to a passenger elevator, except much smaller. When using the cage-type lift, use care to keep door closed, and operate it per the posted instructions. If there are no posted instructions, request instructions from elevator or plant personnel. The maximum load capacity must be posted in the elevators and observed by all persons using the elevators.

Do not use man-lifts or elevators for emergency evacuation of the plant. Power failure or shutdown will cause equipment to stop, possibly trapping occupants.

Ladder Safety

Take the following precautions when using ladders:

- Never use a ladder that has cracked rails or rungs or has slivers on rails.
- Never use a portable straight ladder that is not equipped with safety feet, unless the ladder is securely fastened in place.
- Always climb and descend a ladder facing the rungs and rails.
- Do not climb movable straight ladders unless the foot of the ladder is about one quarter of the ladder length away from the wall.
- Use only a ladder for climbing; use of chairs, boxes or other makeshift ladders invites injury.
- Always use a ladder with safety feet to enter a boxcar or truck. Do not jump from a boxcar or truck.

Lifting Safety

Never attempt to lift an object that is too heavy to handle alone. Get assistance to lift heavy objects. When lifting heavy objects, make sure to follow these safety precautions:

- Get close to the load.
- Keep your back vertical, bend your legs.
- Lift slowly, feel the load react through your legs.
- If needed or warranted, use a proper back support and or lift belt.

Machine and Equipment Safety

When working around machinery, always take the following precautions:

- Never attempt to operate any machinery.
- Never remove a machinery guard or shield on a piece of equipment while it is running. Guards must never be removed unless absolutely necessary for equipment inspection. If guards are removed, steps need to be taken to ensure the equipment is not started and the guards are replaced promptly once the inspection is complete. Some agencies do not permit removal under any condition. If an emergency arises, be prepared by discussing the topic with a supervisor.

Safety Signs

Respect all safety signs in the plant; they are posted for everyone's safety. Failure to obey signs can cause injury. The words "caution" and "warning" may have been overused but there is a reason for their use. Pay attention to directions provided.

Electrical Safety

Never tamper with electrical equipment; electricity can kill quickly.

Hazardous Materials

Chemical compounds are commonly used to control or eliminate insect infestations in agricultural products or in containers used to store or transport these products. Such chemical compounds can present a serious hazard when used in an indiscriminate manner or when individuals disregard necessary safety precautions through ignorance or poor judgment. No individual is immune to the toxicity of these chemicals. There may be many different reactions to exposure to these toxic chemicals, such as a reduction in the body's natural resistance that can compound the effect of the exposure.

Chemical applications to agricultural products or to containers used to store or transport these products may be separated into three categories, each offering a different degree of hazard. When describing a chemical application of a commodity or container, proper terminology must be used, as it can indicate the degree of hazard involved in the application.

The following lists the types of hazardous pesticides that are commonly encountered during pesticide inspections:

- **Contact-Type Pesticides**. Some active ingredients such as Malathion and Pyrethrum are contact-type pesticides (i.e., their effectiveness depends upon the insects coming in contact with the material). Contact pesticides can be applied directly to the commodity or used to eliminate an infestation within a container. Inspectors must not enter or remain in an area while these materials are being applied as sprays or until all vapors or mists have settled from the atmosphere. Many chemicals have a disagreeable odor. Vapor contact and absorption through the skin and the vapor or mist entering the respiratory system can cause ill effects.
- **Smoke and Fog Type Pesticides**. These pesticides are used to treat unoccupied residential, greenhouse and commercial areas, and transportation equipment. Resmethrin, piperonyl butoxide, pyrethrins, malathion, and diclorvous (DDVP) are among the active ingredients currently used as foggers. Such areas must not be entered until the time specified in the Directions for Use has passed. Most fogger propellants are flammable. See PR notice 98-6: Flammability Labeling Requirements for Total Release Fogger Pesticides.
- **Fumigant Pesticides**. The use of fumigants in elevators, mills, and warehouses is not unusual. If a fumigant or unidentifiable odor is detected, check with plant personnel and determine the source of the odor. Fumigants are hazardous to breathe, even at low concentrations. Spray treatments of grain and storage areas within facilities,

elevators and mills are common. Avoid breathing vapor from sprays. If accidental contact is made, wash area of body contacted with mild soap and water. Remove and thoroughly wash clothing, including shoes. Report mishaps to the supervisor and seek the recommendation of a physician.

Fumigants are normally liquid or solid chemical compounds which, when released into the atmosphere, readily turn to the gaseous State. These products are extremely toxic to man and must be handled or dealt with using extreme caution. When a commodity has been fumigated, a percentage of the fumigant is absorbed by the commodity. This fumigant will be desorbed during the aeration process at a retarded rate. After a container has been fumigated, aerated, and resealed, it is possible for a dangerous concentration of the fumigant to build up within the container. When a certificate is issued by a competent person, perform the inspection duties within a two-hour period after testing and issuance of the certificate, providing that the fumigated area has remained open to the atmosphere. In the event the two-hour time period has been exceeded or the container sealed, a new test and certificate by the competent person is required.

Do not enter storage containers during the application of these materials or enter a container where the materials have been applied unless the atmosphere within the containers has been certified safe by a competent person.

Residues remaining on container surfaces, after the application of smoke and fog or fumigant type pesticides are more toxic than the contact-type residues. When performing vessel storage examinations, inspectors may pick up residue on their hands while climbing or descending ladders. Do not eat, smoke, or use toilet facilities until hands are thoroughly washed with soap and water.

Exposure To Hazardous Materials

Indications of exposure to a chemical compound include, but are not limited to, the following symptoms:

- Skin irritation (rash, burning sensation, dryness, and sensitivity).
- Watering of the eyes (also burning sensation).
- Dryness of the nasal passages.
- Coughing.
- Shortness of breath.
- Congestion in the chest.
- Nausea and vomiting.
- Light-headedness.
- Intoxication.

< Ashen complexion.

< Agitation.

Make sure there is easy access to the emergency telephone numbers such as police, fire department, medical doctor or hospital, rescue service, or State or local poison control center. Inspectors must stay aware of their physical condition and surroundings. Horseplay, in any form, is dangerous and strictly prohibited.

Do not take chances where chemical compounds are involved.

If the inspector has any reason to suspect that an inspection poses a potentially harmful or fatal exposure, check with the company's responsible officer. If, after checking, the inspector still has concerns about the potential for harm, he/she must not perform the inspection. Inspectors should consult with their supervisor when such conditions are found.

Report to a supervisor all injuries no matter how small, as well as unsafe conditions and unsafe acts that might be the cause of an accident.

Confined Spaces

Minimum occupational safety and health standards for public employees who may enter into or work in confined spaces are found in OSHA regulations at 29 CFR 1910.146.

To be a confined space, the space must :

< Be large enough and so configured that an employee can bodily enter and perform assigned work.

< Have limited or restricted means for entry or exit.

< Not be designed for continuous employee occupancy.

< Must meet one or more of the following criteria:

- Contains or has a potential to contain a hazardous atmosphere.
- Contains a material that has the potential for engulfing an entrant.
- Has an internal configuration such that a person could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.
- Contains any other recognized serious safety or health hazard.

In addition, in any space that meets the above criteria, and has a depth of 4.5 feet or more from the plane of entry to the plane upon which the worker will perform their work or when a person's head or feet pass the plane of entry or any other opening is considered a confined space.

Some examples of confined spaces include: Tanks, silos, storage bins, hoppers, vaults, and pits.

Hazards

Accidents, occupational illness, and fatalities can occur through asphyxiation, fire and explosion, exposure to substances, falls, electrocution, and a host of other specific hazards. Since confined space entry has resulted in more deaths and injury than any other source in the industry, it is essential to recognize and carefully evaluate the situation prior to entry.

Flammable atmospheres can result from an enriched oxygen atmosphere, vaporization of flammable liquids, concentrations of combustible dust, workplace byproducts or desorption of chemicals from surface coatings.

Too much oxygen, even several percent above the 20.9 percent normally found in our atmosphere will cause an increase in the range of flammability. A flammable atmosphere is created when the oxygen-combustibility mixture is neither too rich nor too lean for combustion to occur. If inadequate ventilation occurs, flammable gasses such as propane, methane, or hydrocarbons can be trapped in a confined space. Since a number of these vapors or gases are heavier than air, they sink to the lower level of the confined space.

Combustible dust concentrations can often be found in grain elevators and silos storage areas.

Entry and Exit

The size of the entry orifice must be taken into account when considering rescue actions. Barriers to entry, and ladders or the lack thereof must also be considered. Workers may fall off ladders, develop claustrophobia or become lodged in the entry orifice.

Inspector Responsibilities

Inspectors must report any hazardous conditions in connection with confined space entry or any safety equipment defects to the facility manager immediately. Without exception, **no inspector shall enter a confined space unless it is absolutely necessary, and only when two or more other persons are present in case an emergency should arise.**

Environmental Biological Hazards

In recent years, increased understanding of environmental pathogens has impacted the agrichemical industry and medical field.

Environmental pathogens that can cause disease in humans include *Salmonella, Staphylococcus, E. coli, Histoplasma capsulatum, Cryptococcus neoformans, Borsrelia burgdorferi, rabies, and Hantavirus.*

The risk of contracting disease from any of these pathogens is extremely small, especially the more deadly pathogens. Certainly, steps can be taken to minimize exposure and possible illness from

these pathogens, no matter how small the risk. Knowing a risk exists prepares one to deal with that risk in a sensible, responsible manner and to take the proper steps to minimize the risks to an individual.

Natural Protection

The world contains many microorganisms. Even today scientists estimate that most of them have not been studied or identified. Fortunately, the human body has a series of defenses that include:

< Skin

< Nasal hairs and mucus

< Cilia in the lungs and the coughing mechanism

< Stomach acids

< The immune system

How Pathogens Enter The Body

It is important to understand how a disease organism enters the body in order to understand how best to protect against the various types of pathogens. The routes of entry into the body include:

< Respiration (inhalation)

< Ingestion

< Skin

< Eyes

< Sexual activity

< Ectoparasites

Common Biological Hazards

Each pathogen has its own epidemiology that describes its mode of transmission, its requirements for development, and the hosts it must have to complete its development.

< Salmonella

- A bacterium.
- Present in the surrounding environment, including the soil. Especially common where decaying food materials are present.
- Causes food poisoning. Sometimes fatal depending on the type and lack of treatment.
- Enters the body by ingestion, usually in infected food or off unwashed hands.

< Staphylococcus

- A bacterium.

- Present in the surrounding environment, including the soil. Especially common where decaying food materials are present.
- Causes infections in cuts and also in eyes. Severe flesh necrosis can occur. Fatalities are rare except if the bacteria enter the bloodstream (septicemia).
- Enters the body through breaks in the skin caused by cuts, abrasions, and blisters.

< E. coli

- A bacterium.
- Present in human and animal feces.
- Causes severe food poisoning, a particular strain not likely to be encountered, can be fatal.
- Enters the body by ingestion of contaminated food or from contact with unwashed hands.

< Histoplasma capsulatum

- A fungus.
- Present in accumulated bird, chicken, and bat feces in contact with the soil. The bird feces enrich the soil allowing the fungus to proliferate.
- Spores become airborne when feces are disturbed.
- Causes respiratory illness (histoplasmosis) and also blindness. Can be fatal but fatalities are rare.
- Enters the body by inhalation of fungal spores and through the eyes.

< Cryptococcus neoformans

- A pathogenic yeast (fungus).
- Present in accumulated pigeon feces within buildings. Does not need to be in contact with the soil.
- Spores become airborne when feces are disturbed.
- Causes respiratory illness (cryptocaccosis). Can develop into cryptococcal meningitis that takes the form of severe headaches, vomiting, vertigo, and dizziness. Most serious to persons with existing lung disease, diabetes, Hodgekin's lymphoma, or leukemia.
- Enters the body by inhalation of fungal spores.

< Hantavirus

- Biosafety Level 4 virus. Twelve different hantaviruses have been discovered to date but only one type is confirmed to cause human disease.
- Carried by the white footed mouse or deer mouse, *Peromyscus maniculatus*. Has not been found in house mouse populations. Other types of hantaviruses have been isolated from other types of rodents, including the cotton rat and voles.
- Virus is spread through aerosolized droplets of deer mouse urine and on microscopic particles of dust infected by urine or associated with deer mouse droppings. Handling deer mouse carcasses also poses a risk.
- Causes Hantavirus Pulmonary Syndrome (HPS) which causes a victim's lungs to fill with fluid, sometimes causing cardiac arrest. Through 4/16/2001, a total of 283 cases of HPS had been reported in the U.S. Thirty-eight of all reported cases resulted in death.
- Deer mice are found most often in areas bordered by woods and fields. Fortunately, the deer mouse does not readily infest buildings.

< Rabies

- A virus.
- Spread by the bite of an infected animal or by improper handling of infected animal carcasses.
- In urban areas, skunks, raccoons, coyotes, and dogs are the primary reservoirs.
- Affects the central nervous system. Always fatal unless treated.

< Borrelia burgdorferi (Lyme Disease)

- A bacterium.
- Carried and spread by various ticks but especially the deer tick, *Ixodes dammini*.
- The reservoir in the wild is the deer mouse.
- Causes a myriad of symptoms depending on which body system is attacked. Attack of the nervous system is the most serious but can cause arthritic-like symptoms. If undiagnosed and untreated for too long, damage to the body may be irreversible.

< Insect and Arthopod Stings

- Effects due to venom from bees, wasps, scorpions, and some ants.
- General swelling and localized reactions are normal.
- Sensitive individuals can lapse into anaphylactic shock which can be fatal.

< Spider Bite

- Effects is due to the venom of black widow spiders and brown recluse spiders.
- Black widow venom affects the nervous system causing most muscle systems in the body to cramp. Rarely fatal except in young children and the elderly.
- Brown recluse venom causes collapse of microscopic blood vessels in area of bite. Lack of blood and nutrients of affected area leads to tissue death and necrosis. Secondary *Staphylococcus* infections can lead to more serious necrosis and possible to loss of the affected limb.
- Plastic surgery is sometimes necessary depending on the seriousness and location of the bite.

Encountering Biological Hazards

Walking in and around or crawling beneath a building can bring a person into contact with pathogens, stinging or biting arthropods and insects. Rodent, bird, and bat feces can be encountered in any attic, crawlspace, garage, cellar, basement or unkept feed mills. Bird feces can be found accumulated on the ground outside and on rooftops.

Bacteria are everywhere in the soil and on every surface. Pathogenic bacteria are most likely encountered where animal feces, decaying food, or decaying animal matter is located. Mishandling rodent or animal carcasses also brings contact with potentially pathogenic bacteria.

Histoplasmosis risk is greatest where bird or bat feces have accumulated in or on top of soil. Cryptococcoses is most likely in accumulations of pigeon feces in attics, false ceilings, and warehouses.

Hantavirus contact is most likely in areas where rodent activity is detected and there is a large amount of droppings and/or the smell of urine. Attics, closets, storerooms, cellars, basement, garages, and warehouses must all be suspect in regards to the potential for encountering mice and other rodents. Hantavirus risk is extremely low.

Bee and wasp stings can occur at any time during the summer especially upon accidental stumbling into a nest of these social

insects. Spider bites can occur when putting on shoes or clothes in which the spider is hiding or when moving a board, landscape timber, or other item under which the spider is hiding.

Protecting Against Environmental Pathogens

If proper PPE is not worn, it cannot protect! The proper PPE needs to be worn by each person who enters areas where pathogens may be encountered. Items that must be available include respirator, protective gloves, unvented goggles, Tyvek coveralls, leather boots/rubber overshoes (or rubber boots), disinfectant soap, disinfectant sprays, and insect repellent.

The procedures outlined below must be followed to protect against the most serious environmental hazards. Common sense and awareness are the best defense in avoiding unnecessary exposure.

- Recognize areas of potential risk, including: numerous rodent droppings; bird droppings on soil, on floors, in attics, etc.; excessively dusty conditions; excess decaying food debris or other decaying organic matter; dead rodents, birds, or other animals present (presence of blow flies and fly pupae); evidence of raccoons, possums, or skunks living in the structure; older buildings.
- Wear a respirator, eye protection, and protective gloves in suspect environments. Persons who have facial hair (i.e. beard) will not achieve a tight enough seal with any respirator.
- Keep all cuts carefully bandaged, especially on hands. Wear gloves.
- Spray rodent droppings, rodent nests, and dead rodents with a disinfectant spray prior to handling or entering a suspect area. Other dead animals must also be treated with disinfectant before handling. Use a pump type sprayer to dispense the product; an aerosol product may disturb small particles and increase exposure.
- Never attempt to sweep up or vacuum animal droppings as dust will become airborne. Spray such areas with disinfectant, let sit for a short period prior to wiping up with rags or paper towels (if they have to be handled at all).
- Remove and dispose of disposable gloves, Tyvek coveralls, and booties immediately after exiting the contaminated area. Continue to wear a respirator and gloves if possible when removing coveralls as dust on the coveralls could become airborne.
- Immediately after removing contaminated items, place them in a plastic bag, spray additional disinfectant solution in the bag, tightly-seal the bag, and properly dispose of the bag.

- Disinfect nitrile, rubber, or latex gloves in an approved disinfectant solution. Rinse thoroughly.
- While wearing protective gloves, clean the respirator face piece with disinfectant solution and rinse thoroughly. Store the respirator in a sealed ziplock type bag.
- When walking or working in areas where ticks could be present (wooded areas, tall grass), tuck pant legs into boots or socks and spray pant legs with insect repellant (unless taking residue samples). It should be noted that if collecting samples or entering an area where samples may be collected, the use of insect repellants may cross contaminate the sample.
- Avoid entering any area where a dog or wild mammal may be present. Any animal acting strangely must be avoided.

Travel Safety

Inspectors may be required to travel several thousand miles a year in order to cover assigned areas or territories. This may be in an Agency-owned vehicle or in the inspector's own vehicle. Regardless, a few key safety points or checks will prove valuable in preventing or minimizing breakdowns and accidents.

Vehicle Safety

Before starting the vehicle, make a quick check of the vehicle's condition. Especially, pay close attention to the tires. Worn tires, low tire pressure or punctures in tires may cause blowout while on the road. Agricultural establishments often will have metal parts, screws, nails, or similar items in the driveway areas of the firm. As such, it may be wise to make a visual inspection prior to leaving inspected firms.

It is also important how equipment is arranged in the vehicle. An inspector is required to carry a vast amount of equipment and supplies. This equipment needs to be arranged and secured in case of a quick stop or collision. In such a case, an unsecured piece of equipment may act as a projectile inside the car. Therefore, attention must be paid to how equipment is stored and secured. Take time and make sure everything is in proper position to avoid unnecessary risks.

In addition, inspectors may be required to transport hazardous materials or samples as part of their duties. Ensure that samples are stored in a manner that would not create a hazard if broken, spilled, or were otherwise released. Also, vapors from these products may be dangerous and must not be stored in the passenger compartment of the vehicle. Hazardous materials must also be properly packaged to prevent breakage and these packages must be secured to prevent them from rolling around.

Vehicle maintenance cannot be overstated. Depending upon EPA and/or GSA guidelines, make sure to routinely check the maintenance of the vehicle. Tires, brakes, fluids, hoses, belts, etc. must all be checked on a regular basis. Inspectors often find themselves in rural or unpopulated areas. While no examination will guarantee unwanted breakdowns, there is a good chance of minimizing them.

Once in the vehicle, always wear a seat belt.

Doors should also be locked while driving. During an accident, an occupant (even if wearing a seat belt) may be thrown from an open door. If the door mechanism is locked, there is a better chance that the door will not fly open.

Keep the vehicle clean. This has two positive dividends. First of all, from a safety standpoint, windshields and headlights need to be unobstructed to work or function properly. Also, leftover cups inside the car may spill or trash may get in the way of the safe operation of the vehicle. A clean vehicle presents a professional appearance.

Personal Safety

Always carry a first-aid kit complete with bandages, topical antibiotic dressings, and antiseptic cleansers. Cuts, scrapes, and bruises are commonplace when working around equipment. Be prepared to treat them rapidly and effectively.

It is advisable to keep current with immunizations. Pay particular attention to tetanus shots and periodical boosters. Discuss with your physician or the Public Health Service physician potential side effects of new medications, such as nausea, drowsiness, or ability to perform your job safely. Read warnings on over-the-counter medication.

Avoid, if at all possible, becoming involved in a confrontational situation. If, however, a situation becomes confrontational, the inspector should exit the inspection site and contact their management and/or the U.S. Marshal Service, police, etc. Obtain a warrant before re-entering the site to continue the inspection.

Lodging Safety

When arriving at a motel or hotel, try to park in well lit areas. Be aware of persons in parking garages and lots. When parked, lock the vehicle. It is best not to leave any type of valuables in the vehicle. If valuables must be stored in the vehicle, try to cover or hide them. Depending on weather conditions (heat and cold), and for security and to ensure chain-of custody, it may be necessary to remove samples from the vehicle and store them in the motel/hotel room or in a secure area.

Be aware of the people in the lobby when checking in. Pay attention to the surroundings.

Once in the room, pay attention to the security mechanisms provided. If dead bolt locks and chains are in place, use them.

Locate the nearest exit in case of fire or an emergency. Usually, evacuation instructions will be posted in the room. If not, make a visual check of how to get out safely.

Use the peep hole in the door to visually identify persons knocking on the door. If the person claims to be a hotel or motel employee, get the person's name and verify via telephone with the front desk before letting the person into the room. If the person is indeed an employee, they will not mind.